Dr. Green

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"Exotic molecules" / Ann Rev Phys Chem

Thank you for a comprehensive review that I found most helpful in bringing me up to date. (The enclosed article is a purely speculative foray; it does indicate what may be the biological implications of interstellar chemistry.)

Almost no one - perhaps excepting Anders - shares this interest even today.

(The paper is quite naive in its primary thrust - that the lunar regolith would be a helpful site; today we should perhaps substitute a planetary mission.

Sincerely,

Joshua Lederberg

Duley had a large impact on my thinking circa 1958. Do you not mention calculated, or just that you did not reach back so far?

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INTERSTELLAR CHEMISTRY: Exotic Molecules in Space[1]

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Sheldon Green

NASA Goddard Institute for Space Studies,
2880 Broadway, New York, New York 10025

INTRODUCTION

The field of interstellar chemistry had its beginnings in 1968 with the microwave detection of the first interstellar polyatomic molecule, ammonia. Since then over 50 species have been identified in space (Table 1) (1). Before this it had been thought that molecular processes (as opposed, for example, to atomic and nuclear processes) played little or no role in astrophysics. The wealth of molecular radioastronomical data that has accumulated in the last decade demonstrates quite forcefully that this is not true. Analysis of this data requires information about a number of molecular properties and processes which fall traditionally into the area of physical chemistry. However, because conditions in interstellar space are so different from those which are normally attained in the laboratory—essentially zero pressure and nearly zero temperature—attempts to understand interstellar chemistry have stretched the limits of current physical chemical knowledge. The flow of information between molecular radioastronomy and physical chemistry has therefore been reciprocal, and it is likely to remain this way for some time.

Although still quite young, the field of interstellar chemistry has uncovered a remarkably rich and varied phenomenology that has already made important contributions to our understanding of both astronomy and chemistry. In fact, the field is much too broad to be adequately surveyed within the space limitations of this article. Molecular radioastronomical observations have provided important new information for astrophysics, including the morphology and thermal balance of the interstellar medium, clues to stellar evolution, and information about cosmic isotope ratios that

P.S. Has anyone calculated the expected lifetime of carbonaceous micro-meteorite deposits on moon? What should that then give for surface density?

(As Tommy Gold suggested re "ice" one might have to look for sun-shaded defiles).